

tillage, especially through leaching in late spring-early summer. Placement of fertilizers near the soil surface, as with no-tillage, can result in higher concentrations of nutrients in sediments, but sediment losses are reduced so much that the effect is not important. An additional environmental advantage of reduced tillage is the marginal energy savings, which is important on a farm but not a national level. An environmental disadvantage is the fostering of resistant weed species, which require more exotic herbicides to combat them.

U.S. Congress. 1983. Appropriate Technology: Research in Alternative Agriculture Systems, Hearing before the Subcommittee on Natural Resources, Agriculture Research and the Environment of the House Committee on Science and Technology, September 30, 1982, 97th Congress, 2nd session, USGPO Washington, D.C., No. 162.

Testimony by Dr. Richard Harwood of Rodale Research Center --

Looking at whole farms and whole farming systems, there are 30-40,000 farmers in the U.S. who call themselves "organic" (using the broad USDA definition), who are minimizing inputs.

Mentions collaborative study with Penn State [see Madden 1987] -- demographically these organic farms have approximately the same size and the same variability in types of enterprise as agriculture in general. There are 2,000-acre organic farms and 50-acre organic farms. On the West Coast they tend to be non-livestock, specialty crop-oriented while in the Midwest to northeast they tend toward integrated crop-livestock. But they are characteristically management intensive (illustrated by the difference between IPM, which requires careful monitoring, and weekly spraying according to a formula).

Economically --

- a. management, labor and perhaps machinery costs are somewhat higher, but the cash input costs are considerably lower;
- b. total cost of production is somewhat lower
- c. yields vary from about the same [as conventional] to some 10% less, but there are also individual examples where yields are as much as 20-30% above those of neighboring farms.

The most significant characteristic [of organic farms] is the drastic reduction in inputs which comes about by structuring the farm to get particular kinds of interactions (e.g., certain crop combinations in well-defined, scheduled rotations).

Re: the transition to organic farming -- when you stop using intensive inputs on a field with a long-term history of conventional use, the stoppage is extremely disruptive; it takes 3-5 years to restore a field after heavy use of conventional fertilizers and pesticides.